I-40 Corridor Profile Study

ARIZONA/CALIFORNIA STATE LINE TO JUNCTION I-17

ADOT Work Task No. MPD 072C-14

ADOT Contract No. DT11-013152

DRAFT WORKING PAPER 1: LITERATURE REVIEW

AUGUST 2014

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CAMBRIDGE SYSTEMATICS

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LIST OF ACRONYMS AND ABBREVIATIONS

ABBREVIATION	NAME
AC	Asphaltic Concrete
ACFC	Asphaltic Concrete Friction Course
ADOT	Arizona Department of Transportation
BqAZ	Building a Quality Arizona
DCR	Design Concept Report
EA	Environmental Assessment
FY	Fiscal Year
I	Interstate
ITS	Intelligent Transportation Systems
LRTP	Long Range Transportation Plan
MP	Milepost
MTN	Mountain
N/A	Not Applicable
OP	Overpass
P2P Link	Planning to Programming Link
POE	Port of Entry
TI	Traffic Interchange
UP	Underpass
USDOT	United States Department of Transportation
WIM	Weigh in Motion

1 Introduction

1.1 Study Purpose

The Arizona Department of Transportation (ADOT) will conduct corridor profile studies for nine strategic corridors in the State of Arizona. Interstate 40 (I-40) is one of those nine strategic corridors. The purpose of a corridor profile study is to provide insight and results to connect the strategic visions developed in Building a Quality Arizona (BqAZ) to performance-based programming processes known as Planning to Programming Linkages (P2P Link) that satisfy both funding constraints and progress towards realizing the vision. In support of this study purpose, the I-40 Corridor Profile Study, Arizona/California State Line to Junction I-17 must address current and future needs in the I-40 corridor using a study process that can be applied statewide to establish priorities for improving Arizona's strategic corridors.

This study, as well as other corridor profile studies, will be guided by processes developed in P2P Link. P2P Link is a performance–based approach to planning, programming, and financial decisions that ensure that available funds are used in the most productive way to meet overall transportation system performance objectives. The P2P Link connects the investment strategies of the State's Long Range Transportation Plan to ADOT's Five-Year Construction Program. This connection ensures that the policy guidance in the long-range transportation plan is adhered to in improving the State transportation system.

1.2 Study Objectives

Objectives of the I-40 Corridor Profile Study are:

Collaborate with ADOT and others to maximize procedural consistency among the corridor profile studies. This study needs to be coordinated with two other ongoing corridor profile studies on I-17 and I-19.

Assess the existing performance of the corridor. Existing corridor performance will be assessed using the performance measure categories developed in P2P Link to ensure consistency with MAP-21 performance goals. Input from past studies, completed projects, and the current construction program will be reviewed to determine the track-record of corridor improvements and investment strategies over recent years.

Establish a performance-based vision for the corridor. The corridor will be defined in terms of future performance targets that will serve as a "vision" to guide corridor preservation, modernization, and expansion.

Determine the health of the corridor and identify performance-based needs that must be addressed to achieve the corridor vision. Existing performance will be compared with visionary performance targets to define corridor needs.

Develop and evaluate solution sets and corresponding investment strategies that lead to achieving corridor performance visions. Corridor solution sets will be developed to advance the corridor toward its performance targets.

Scope and prioritize solution sets and projects using criteria consistent with P2P Link and a risk assessment approach. Project scoping is a critical step to transition from solution sets to project candidates. Project scoping will include appropriate emphasis on development issues and life-cycle costing to ensure that recommendations are ready to be considered in a risk assessment framework before being considered as candidates for P2P selection and priority processes.

Document study procedures, measures, criteria, and relationships with the P2P Link to serve as guidance for future profile studies. A well-documented process will be a key requirement for creating consistency between the nine corridor studies and P2P Link selection and priority procedures.

1.3 Study Location and Corridor Segments

The location of the I-40 Corridor Profile Study is illustrated in **Figure 1**. The corridor study limits extends from milepost 000 at the Arizona/California state line to approximately milepost 196, east of the I-40/I-17 freeway interchange. The study limits include the I-40/I-17 freeway interchange.

The I-40 study corridor has been divided into fourteen segments to allow for an appropriate level of detailed analysis of needs, evaluation of performance, and comparison between different segments of the corridor. Characteristics considered during the segmentation of the corridor can be summarized into three main categories:

- Roadway grade – associated with elevation, terrain, and weather
- Roadway cross-section – associated with the number and type of travel lanes, whether carriageways are separated or not, and if the roadway is in an urban or rural environment
- Traffic conditions – associated with changes in traffic volume numbers or composition, the presence of major highway junctions, and the influence of adjacent land uses

These characteristics are relatively consistent within each segment but may vary widely between segments. Segments range in length from 6 miles to 32 miles, with an average of 14 miles. Segment break points are located at whole number mileposts where characteristics are fairly consistent (e.g., between traffic interchanges). Segment break points do not necessarily correspond to political or agency boundaries as the focus of the segmentation methodology are on physical characteristics. Segments are numbered 40-1, 40-2, etc. going from west to east along the corridor. The "40" in the segment number identifies the segment as pertaining to I-40.

These corridor segments are described in **Table 1** and shown in **Figure 2**.

Table 1: I-40 Corridor Segments

Segment Number	Begin Milepost	End Milepost	Length (miles)	Description of Segment Characteristics
40-1	0	11	11	Rolling terrain, rural, 3 traffic interchanges (TIs), one port-of-entry (POE), Havasu National Wildlife Refuge, State Trust land, Bureau of Land Management (BLM) land, private land, community of Topock, junction with State Route (SR) 95 (which connects to Lake Havasu City)
40-2	11	43	33	Relatively flat terrain, rural, 6 TIs, BLM and private land, community of Yucca, Chrysler Arizona Proving Ground
40-3	43	55	12	Mountainous terrain, urban, 4 TIs, BLM and private land, city of Kingman, junction with US 93 (which connects to Las Vegas), junction with SR 66 (which connects to Peach Springs)
40-4	55	74	19	Rolling terrain, rural, 3 TIs, State Trust land, BLM and private land, junction with US 93 (which connects to Wickenburg), shared route with US 93, planned future I-11 route
40-5	74	80	6	Rolling terrain, rural, 1 TI, State Trust and private land, Silver Springs Road
40-6	80	98	18	Mountainous terrain, rural, 3 TIs, State Trust and private land, Willow Creek, separate carriageways
40-7	98	108	10	Rolling terrain, rural, 1 TI, State Trust and private land, Jolly Road
40-8	108	120	12	Mountainous terrain, rural, 1 TI, State Trust and private land, Anvil Rock Road
40-9	120	143	23	Rolling terrain, rural, 2 TIs, State Trust and private land, community of Seligman, junction with Route 66 (which connects to Peach Springs)
40-10	143	160	17	Rolling terrain, steep grade, rural, 7 TIs, private and National Forest land, communities of Ash Fork and Pine Springs, junction with SR 89 (which connects to Chino Valley)
40-11	160	168	8	Rolling terrain, rural, high elevation, 4 TIs, private and National Forest land, community of Williams, junction with SR 64 (which connects to the Grand Canyon)
40-12	168	184	16	Rolling terrain, rural, high elevation, 2 TIs, private and National Forest land, community of Parks, Navajo Army Depot
40-13	184	190	6	Rolling terrain, rural, high elevation, 1 TI, National Forest land, community of Bellemont, Navajo Army Depot
40-14	190	196	6	Rolling terrain, urban, high elevation, 4 TIs, State Trust land, National Forest and private land, city of Flagstaff, junction with I-17 (which connects to Camp Verde and Flagstaff)

1.4 Working Paper 1 Overview

The purpose of Working Paper No. 1 is to review studies, plans, and construction programs related to the I-40 corridor conducted over the last fifteen years to document historic investments, unmet corridor needs, and corridor visions that will inform corridor performance targets developed in Task 3 of the study. In addition, environmental clearance documents were reviewed to assess significant environmental resources, clearances, and standing mitigation requirements. This report also documents performance metrics used in past studies. The status of project recommendations from past studies and programs are documented (completed or constructed projects, environmentally cleared projects, programmed projects, projects in construction, or no action taken).

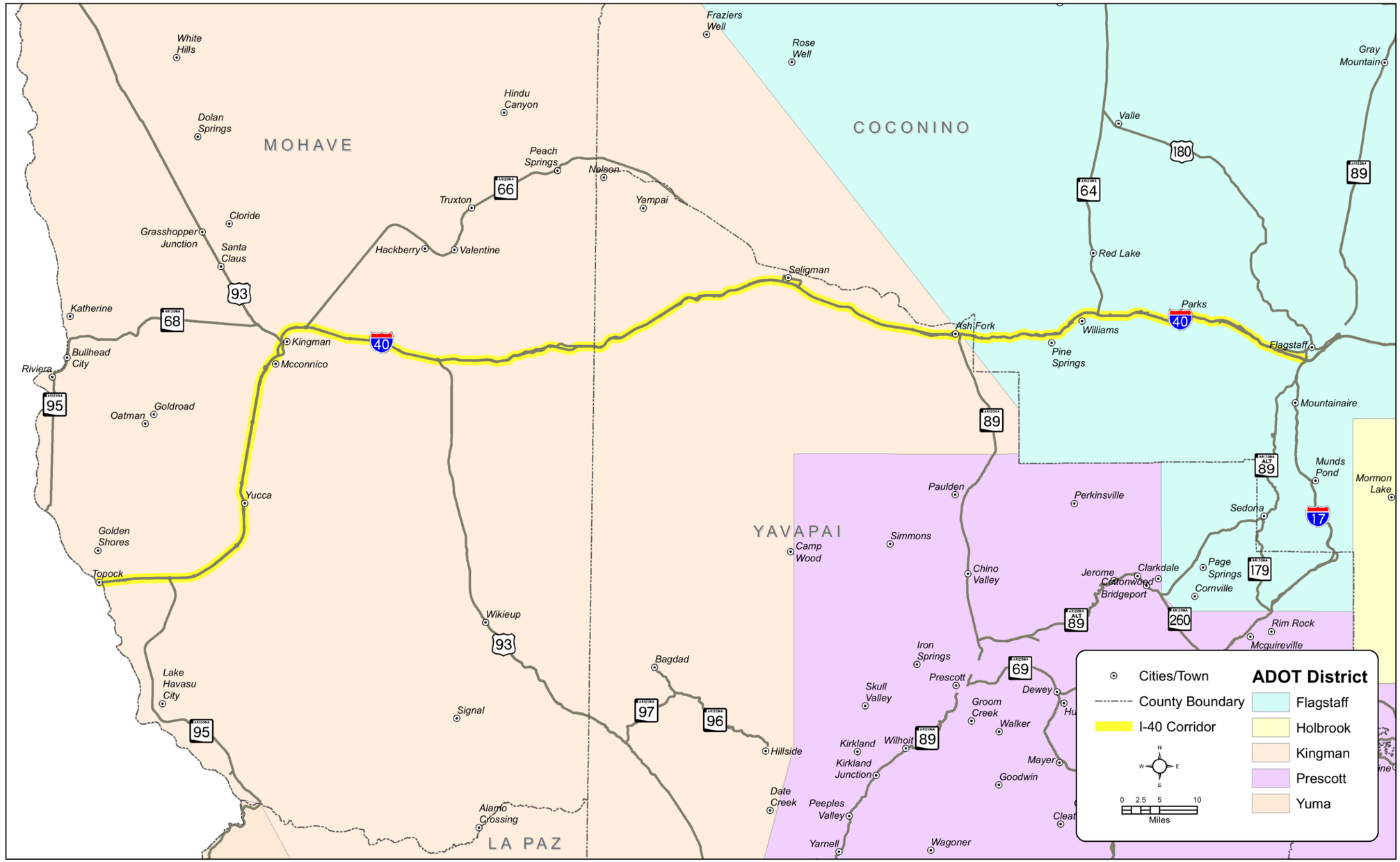

Figure 1: Location Map

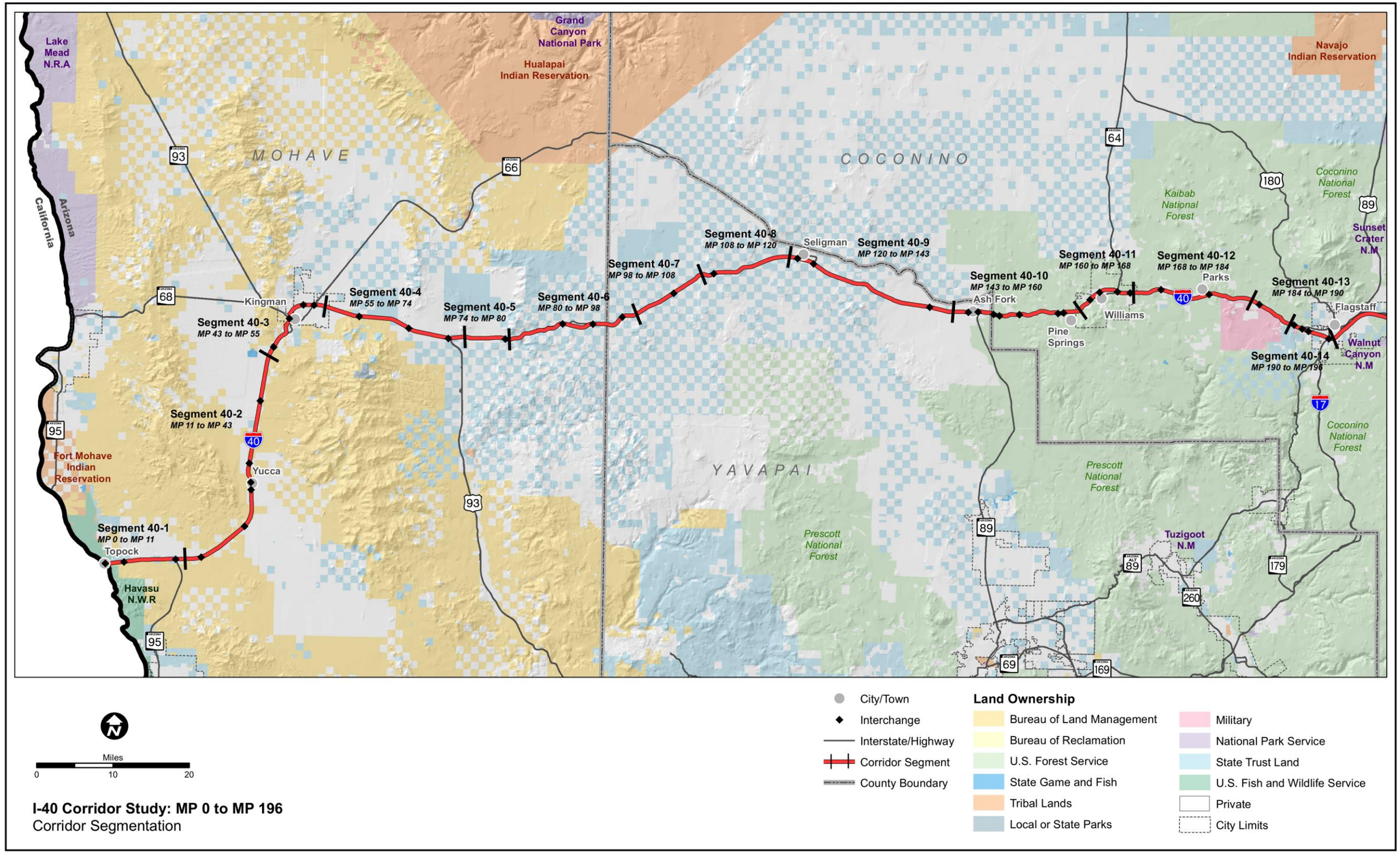

Figure 2: I-40 Corridor Segments

2 Literature Review

A literature review was conducted to summarize available prior studies, plans, and programs pertinent to the I-40 Corridor within the study limits. The documents reviewed for the literature review are listed in **Table 2.**

The literature review documents were grouped in the following categories:

- State/regional plans and programs (**Table 3**)
- Corridor documents (**Table 4**)
- Location specific documents (**Table 5**)
- Mode specific documents (**Table 6**)

A reference list of projects constructed since 1999 in the study area is provided in **Table 7**. This list was compiled from a listing of as- built plans obtained from ADOT.

The literature review is summarized in tabular form. **Tables 3 through 6** include the following information:

- Name of study
- Date
- Prepared by/for
- Overview
- Recommendations
- Location or Begin MP
  - Description of document
  - Objective of project. Options are:
    - Preservation: Activities that protect transportation infrastructure by sustaining asset condition or extending asset service life. Examples of preservation recommendations include regular maintenance and resurfacing of pavements, replacing aged transit vehicles, upgrading rail track, and airport runway rehabilitation.
    - Modernization: Highway improvements that upgrade efficiency, functionality, and safety without adding capacity. Examples of modernization recommendations include widening of narrow lanes, access control, bridge replacement, hazard elimination, lane reconstruction, aviation upgrades, and bus system upgrades.
    - Expansion: Improvements that add transportation capacity through the addition of new facilities and or services. Examples of expansion recommendations include adding new highway lanes, expanding bus service, construction of new highway facilities, and adding rail passenger service or facilities.
- Status of recommendation – The status of the recommendations was determined from a number of sources including the Active Project Status Reports for the ADOT Flagstaff and Kingman Districts, the State Transportation Improvement Program and information from the ADOT Engineering Records Section. Key information reported on the status of recommendations were:
  - No action
  - Environmental document
  - State Transportation Improvement Program (STIP) Year and project number
  - Construction Year
- Performance Measures – Performance measures are identified if documented.

An overview of key projects recommended for the I-40 corridor is shown graphically in **Figure 3**. This figure shows proposed freeway lanes and interchanges as well as interchange improvement and reconstruction projects implemented since 1998.

Table 2: Summary of Documents Reviewed

Name	Year	Prepared By / For
State/ Regional Plans and Programs		
2014-2018 State Transportation Improvement Program	2013	Arizona Department of Transportation
2014-2018 State Transportation Improvement Program Amendment 19	2014	Arizona Department of Transportation
2014-2018 State Transportation Improvement Program Amendment 15	2014	Arizona Department of Transportation
2014-2018 State Transportation Improvement Program Amendment 12	2014	Arizona Department of Transportation
Statewide Transportation Planning Framework Northern Arizona Regional Framework Study Working Paper 3 - Scenarios and Evaluation Development	2009	HDR/Arizona Department of Transportation
Statewide Transportation Planning Framework Western Arizona Regional Framework Study Working Paper 3 - Scenarios and Evaluation Development	2009	Parsons - Brinckerhoff/Arizona Department of Transportation
2010 Statewide Transportation Planning Framework	2010	Arizona Department of Transportation
What Moves You Arizona, Long-Range Transportation Plan 2010-2035	2011	Arizona Department of Transportation
Climbing and Passing Lane Study	Ongoing (will be reviewed in Final Working Paper 1)	Arizona Department of Transportation
Flagstaff Pathways 2030 Regional Transportation Plan	2009	Charlier Associates/ Flagstaff Metropolitan Planning Organization
Arizona Transparency Report	2012	Arizona Department of Transportation
Corridor Documents		
Strategic Plan for Early Deployment of ITS on I-40	1997	Kimley-Horn and Associates / Arizona Department of Transportation
I-40 TTIS (Traveler and Tourist Information System) Tourist Intercept Survey	1998	Battelle / USDOT ITS Joint Program Office
I-40 TTIS (Traveler and Tourist Information System) Route Diversion Study	1998	Battelle / USDOT ITS Joint Program Office
I-40 TTIS (Traveler and Tourist Information System) Focus Groups and Personal Interviews	1998	Battelle / USDOT ITS Joint Program Office
I-40 Multimodal Corridor Profile Study	1999	Lima & Associates and TransCore / Arizona Department of Transportation
Location Specific Documents		
Initial Design Concept Report, I-40, Bellemont Road to Winona	2011	Stanley Consultants / Arizona Department of Transportation
I-40/ US 93 West Kingman Traffic Interchange Feasibility Study	2009	Kimley-Horn and Associates / Arizona Department of Transportation
Topock Port of Entry Initial Project Assessment	2013	Kimley-Horn and Associates / Arizona Department of Transportation
I-40, Kingman Crossing Traffic Interchange Final Design Concept Report	2010	URS Corporation / Arizona Department of Transportation
I-40, Kingman Crossing Traffic Interchange, Categorical Exclusion	2009	EcoPlan Associates, Inc. / Arizona Department of Transportation
I-40 Rattlesnake Wash Traffic Interchange, Final Design Concept Report	2007	URS Corporation in association with EcoPlan / Arizona Department of Transportation
I-40 Rattlesnake Wash Traffic Interchange, Categorical Exclusion	2007	EcoPlan Associates, Inc. / Arizona Department of Transportation
Mode Specific Documents		
Northern Arizona Council of Governments Regional Transportation Coordination Plan	2014	Northern Arizona Council of Governments
Western Arizona Council of Governments Regional Transportation Three Year Coordination Plan Update, 2014-2015	2013	Western Arizona Council of Governments
A Coordinated Transit Plan for Economic Collaborative of Northern Arizona (ECoNA) in Northern Arizona	2014	LSC Transportation Consultants / Community Transportation Association of America (CTAA)
Statewide Bicycle and Pedestrian Plan Update	2013	Kimley- Horn / Arizona Department of Transportation
SCAG Goods Movement Truck Count Study	2002	VRPA Technologies/SCAG
Assessment of Out of State Heavy Duty Truck Activity Trends in California	2008	Nicholas Lutsey, UC-Davis/CARB
Arizona Multimodal Freight Analysis Study	2007	Arizona Department of Transportation
Arizona State Rail Plan	2007	Arizona Department of Transportation
Statewide Rail Framework Study	2010	Arizona Department of Transportation
ADOT Ports of Entry Study	2013	Arizona Department of Transportation
Freight Analysis Framework	2013	Federal Highway Administration
Transamerica Transportation Corridor Feasibility Study	1994	Wilbur Smith Associates/ Transamerica Transportation Corridor Steering Committee
National Performance Management Research Data Set	2013	FHWA
Travel Time in Freight Significant Corridors	2007	FHWA
Freight Performance Measures Web Based Tool (FPMWeb)	Ongoing	FHWA
STB Carload Waybill Sample	2012	Surface Transportation Board
NCFRP Report 10: Performance Measures for Freight Transportation	2011	Gordon Proctor and Associates/ National Cooperative Freight Research Program

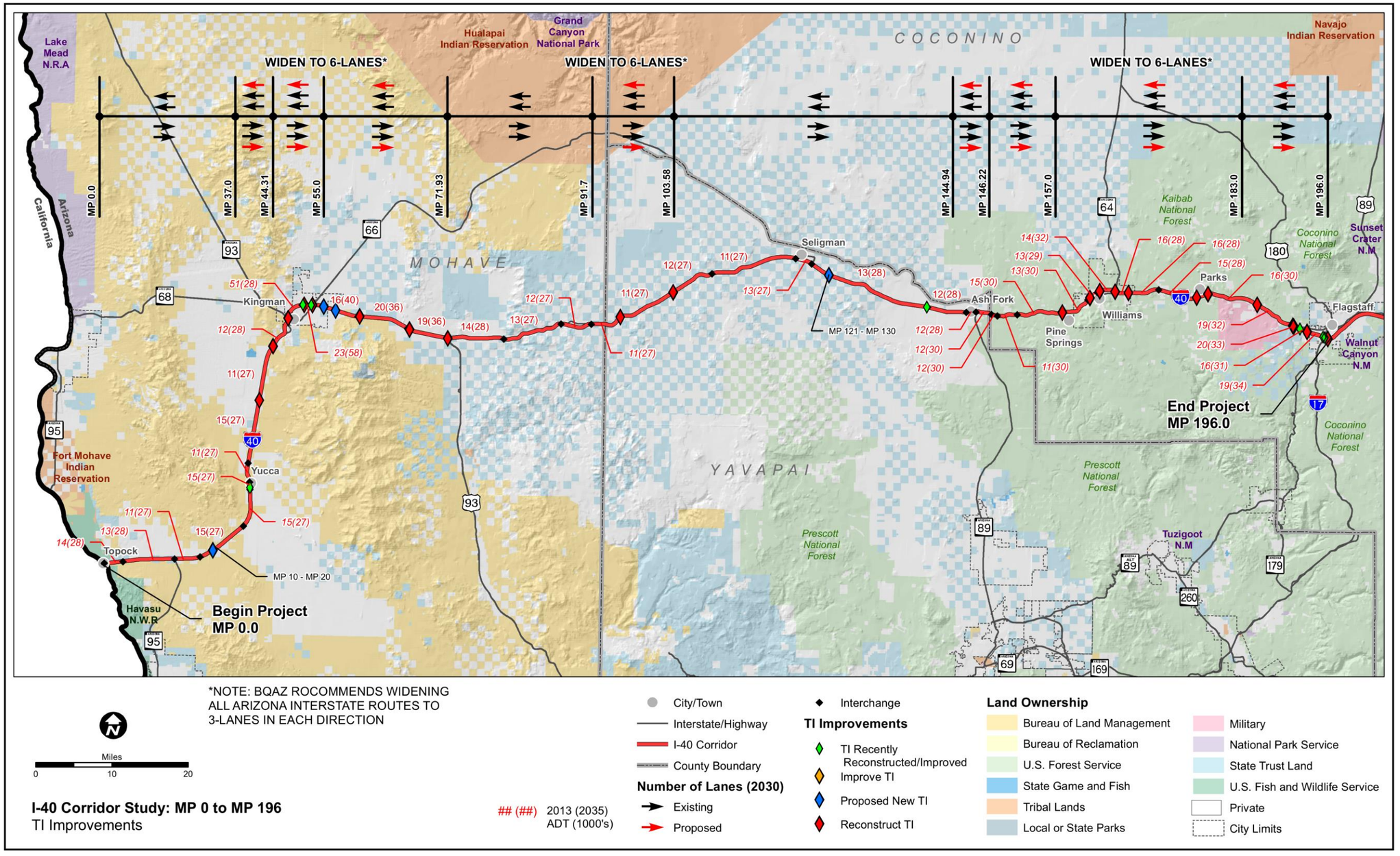

Figure 3: Summary of Previously Recommended Projects on I-40

2.1 State/Regional Plans and Programs

Transportation plans and programs are prepared and updated by state and regional planning agencies such as the ADOT Multimodal Planning Division (MPD), the Flagstaff Metropolitan Planning Organization (FMPO), the Northern Arizona Council of Governments (NACOG), and the Western Arizona Council of Governments (WACOG). The latest versions of transportation plans prepared by these agencies were reviewed to document transportation improvements recommended on I-40. A transportation plan of note is the Building a Quality Arizona (BqAZ, 2010) which recommended a visionary transportation plan for 2050. BqAZ recommendations for statewide transportation visions were developed from regional transportation framework studies conducted for regions of the state. Framework studies for the northern and western regions were reviewed for recommended improvements to I-40.

Transportation programs include cost-constrained project recommendations are updated annually. Programs developed at the regional level are integrated with the ADOT Five-Year Construction Program so only the current ADOT program and amendments are summarized in this section.

Table 3: Summary of Statewide / Regional Plans and Programs Relating to I-40 Corridor

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation					Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number		Construction Year*	
2014-2018 State Transportation Improvement Program (STIP)	2013	Arizona Department of Transportation	The State Transportation Improvement Program identifies statewide priorities for transportation projects. The STIP is financially constrained and maintained by year.	MP 11.2	Bridge deck rehabilitation - Boulder / Franconia/Illavar Wash Bridge EB structure #1587,1589, 1591 & 1310	√	N/A	N/A	N/A	N/A	FY 2016	Design - 24614 / H863401D, Construct 15516 / H863401C	FY 2016	N/A
				MP 40 (revised to MP 125 per Active Project Status Report)	Sign Rehabilitation - Crookton to Transwestern	√	N/A	N/A	N/A	N/A	FY 2014	Design - 14014 / D, Construction - 10217 / C	FY 2017- bid estimated 1/17/17	
				MP 48	Rockfall mitigation - south of Kingman	√	N/A	N/A	N/A	N/A	FY 2015	12815 / C	FY 2015 – bid estimated 8/14/15	
				MP 56.9	Pavement preservation - Rattlesnake Wash to Junction US 93	√	N/A	N/A	N/A	N/A	FY 2014	14114 / H813401C	FY 2014- bid date 1/29/2014 - $20,000,000	
				MP 72	Pavement preservation - Junction US-93 to MP 74	√	N/A	N/A	N/A	N/A	FY 2014	Design support- 24714 / D, Construction - 20415 / C	FY 2016 –bid date estimated 11/16/16 (note-this project appears to be combined with the Hwy 141 to Silver Springs project below)	
				MP 74	Pavement Preservation - Hwy 141 Junction to Silver Springs Rd	√	N/A	N/A	N/A	N/A	FY 2014	Design - 24914 / D, Construction- 12915 / C	FY 2016 – bid date estimated 11/16/16	
				MP 73.2	Bridge deck rehabilitation and scour retrofit - Peacock Wash WB structure #1251 & Big Sandy WB structure #1253	√	N/A	N/A	N/A	N/A	FY 2014	24814 / H842301C	FY2014 – was bid 3/14/2014 - $4,500,000	
				MP 81	Slope Management Program - East of US 93 TI	√	N/A	N/A	N/A	N/A	N/A	10317 / C	FY 2017	
				MP 83.2	Bridge Deck Rehabilitation - Willow Creek Bridge EB, structure #1592,1594,1595 & 1768	√	N/A	N/A	N/A	N/A	N/A	20515 / H861301C	FY 2016	
				MP 83	Bridge Rehabilitation - Willow Creek Bridge EB, structure #1593	√	N/A	N/A	N/A	N/A	N/A	20615 / H861801C	FY 2015 – bid estimated 7/14/15	
				MP 83	Rockfall Mitigation - Willow Springs	√	N/A	N/A	N/A	N/A	N/A	10417 / C	FY 2017	

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation					Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number		Construction Year*	
2014-2018 State Transportation Improvement Program (STIP), Continued	2013	Arizona Department of Transportation	The State Transportation Improvement Program identifies statewide priorities for transportation projects. The STIP is financially constrained and maintained by year.	MP 86.2	Pavement preservation - Willow TI - Markham Wash	√	N/A	N/A	N/A	N/A	FY 2014	Design - 25014 / D, Construction - 20715 / C	FY 2015 - bid estimated 2/15/15	N/A
				MP 102	Upgrade existing rock fall protection with concrete barrier along I-40 - Cross Mt. - Jolly Rd	√	N/A	N/A	N/A	N/A	FY 2014	16313 / H860901C	Bid planned 6/14/14	
				MP 144.6	Bridge deck rehabilitation - Ashfork railroad bridge - E. Ash Fork TI OP, structure #807, #440, #1760,-#1767	√	N/A	N/A	N/A	N/A	FY 2014	13115 / H851501C	FY 2014 – was bid 2/18/14 - $7,500,000	
				MP 166	Pavement preservation - Garland Praire - Parks TI	√	N/A	N/A	N/A	N/A	FY 2014	Design - 25314 / D, Construction - 20915 / C	FY 2016 – bid planned 11/15/16	
				MP 179	Pavement preservation - Parks TI - Riordan Bridge	√	N/A	N/A	N/A	N/A	FY 2015	Design- 21015 / D, Construction -15816 / C	FY 2017	
				MP 181.8	Rockfall Mitigation - East of Parks	√	N/A	N/A	N/A	N/A		16413 / H833501C	FY 2014 – was bid 3/5/14- $2,500,000	
				MP 185	Sign rehabilitation - Transwestern to - Leupp Jct.	√	N/A	N/A	N/A	N/A	FY 2014	Design - 14214 / D, Construction - 14214 / D	FY 2016 – bid estimated 6/16/16	
				MP 4	Topock Port of Entry	N/A	√	√	N/A	N/A	N/A	N/A	Listed as an unfunded project	
				MP 57	Rancho Santa Fe Parkway Traffic Interchange	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Listed as an unfunded project	
Transportation Improvement Program Amendment 19	June 20, 2014	Arizona Department of Transportation	Project modifications to FY 2014-2018 Transportation Improvement Program	MP 179	I-40, Parks TI- Riordan Bridge – establish new design - $320k in FY 2014. Construction estimated in FY 2018 for $13.7M	√	N/A	N/A	N/A	N/A	FY 2014	01D	FY 2018	N/A
				MP 195	I-17/I-40 Interchange, Structures #1261-#1264 – design bridge deck rehabilitation. Approved new design project of $1M in FY 2014. Construction phase in FY 2017.	√	N/A	N/A	N/A	N/A	FY 2014	H877501D	FY 2017	N/A
				MP 165	E. Williams RR Overpass, structure # EB 1911 & WB #1912. Design bridge deck rehabilitation in FY 2014. Construction in FY 2017	√	N/A	N/A	N/A	N/A	FY 2014	Design - H872701D	FY 2017	N/A

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation					Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number		Construction Year*	
Transportation Improvement Program Amendment 19	June 20, 2014	Arizona Department of Transportation	Project modifications to FY 2014-2018 Transportation Improvement Program	MP 22.7	I-40 Haviland Rest Area parking lots. Approved new construction for $100k in FY 2014. Construction $425k	N/A	√	N/A	N/A	N/A	FY 2014	Design - H976401D	Design - FY 2014	N/A
				MP 191	West Flagstaff TI overpass structure EB # 1128 and WB #1129. Establish new design project for $500k. Construction anticipated in FY 2017.	N/A	N/A	N/A	N/A	N/A	FY 2014	Design H877701D	FY 2017	N/A
Transportation Improvement Program Amendment 15	May 16, 2014	Arizona Department of Transportation	Project modifications to FY 2014-2018 Transportation Improvement Program	MP 102	I-40, Cross Mountain to Jolly Road- Upgrade rock fall protection with concrete barrier – increase funding to 2,500k.	√	N/A	N/A	N/A	N/A	FY 2014	H860901C	Bid planned 6/14/14.	N/A
Transportation Improvement Program Amendment 12	March 17, 2014	Arizona Department of Transportation	Project modifications to FY 2014-2018 Transportation Improvement Program	MP 49	I-40, West Kingman TI Interim improvements (spot safety improvements). Establish design for $213k in FY 2014 and construction in FY 2016.	N/A	√	N/A	N/A	N/A	FY 2014	H874401D HSIP 040-A( )	FY 2016	N/A
				MP 46	I-40, Holy Moses Wash Bridges deck design rehabilitation. Establish design for $450k in FY 2014.	√	N/A	N/A	N/A	N/A	FY 2014	H872801D FA 040-A-(220)T	Design - FY 2014	
Statewide Transportation Planning Framework - Northern Arizona Regional Framework Study Working Paper 3 - Scenarios and Evaluation Development	June 2009	HDR/Arizona Department of Transportation	Working Paper 3 presents future roadway and transit needs. Three scenarios developed to address needs. The Northern Framework region includes I-40 from New Mexico border to Yavapai County west boundary.	MP 123.3	Pavement Preservation, Seligman-Crookton(WB)	√	N/A	N/A	N/A	N/A	N/A	Seligman-Crookton(WB), mill and replace, IM 040-8(201)A H6568 01C	2010	N/A
				Dead River Bridge	Bridge Scour Retrofit, Dead River Bridge EB, Structure # 565	√	N/A	N/A	√	N/A	N/A	N/A	in 2009-2013 ADOT Five-Year Construction Program	
				Black Creek Bridge	Bridge Scour Retrofit, Black Creek Bridge #1134, 1642 and 954	√	N/A	N/A	√	N/A	N/A	N/A	In 2009-2013 ADOT Five-Year Construction Program	
				MP 177- 182 (WB and EB)	Shoulder rehabilitation, MP 177 to MP 182 (WB and EB)	N/A	√	N/A	N/A	N/A	N/A	TRACS H7514 01C Project FFA 040-C(200)	2010	
				I-40, Navajo Army Depot area	Pavement Preservation, Navajo Army Depot WB , MP 182-190.84	√	N/A	N/A	N/A	N/A	N/A	TRACS H7689 01C FA 040-C(201)	2009	

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation					Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number		Construction Year*	
Northern Arizona Regional Framework Study Working Paper 3, Continued	June 2009	HDR/Arizona Department of Transportation	Working Paper 3 presents future roadway and transit needs.	New Mexico border to Yavapai County west boundary	Widen I-40 to 6 lanes within the study area	N/A	N/A	√	√	N/A	N/A	N/A	N/A	N/A
				I-40 corridor	Improve passenger rail service along I-40	N/A	N/A	√		N/A	N/A	N/A	N/A	
Statewide Transportation Planning Framework Western Arizona Regional Framework Study Working Paper 3 - Scenarios and Evaluation Development	May 2009	Parsons - Brinckerhoff/ Arizona Department of Transportation	Working Paper 3 presents future roadway and transit needs. Three improvement scenarios were developed to address needs. The Western Framework region includes I-40 from the Yavapai County west boundary to the California border. I-40 east of US 93 was anticipated to experience extreme congestion in 2030.	I-40, McConnico TI to Jct. US-93 south	Widen I-40 to 6-lane, 49.3 miles	N/A	N/A	√	√	N/A	N/A	N/A	N/A	Evaluation criteria were developed in areas of mobility and access, transportation/ land use integration, environmental and conservation, and economic benefit.
				Between US-95 in Mohave County	Widen I-40 to 8-lanes, 22.78 miles	N/A	N/A	√	√	N/A	N/A	N/A	N/A	
				From US-95 to State line east in Mohave County	Widen I-40 to 6-lane, 21.26 miles	N/A	N/A	√	√	N/A	N/A	N/A	N/A	
				not specified	Traffic access, safety considerations, and enforcements	√	√	N/A	N/A	N/A	N/A	N/A	N/A	
				I-40/US 93 interchange	Reconstruct I-40/US 93 interchange	√	√	N/A	N/A	DCR and EA scheduled FY 2014. Feasibility Study conducted in 2009.	N/A	N/A	N/A	
				I-40/US 95 interchange	Construct new system interchange at I-40/US 95	N/A	√	√	√	N/A	N/A	N/A	N/A	
				US 93/ I-40 direct connect	Design and construct US 93/ I-40 direct connect	N/A	N/A	N/A	N/A	DCR and EA scheduled FY 2014. Feasibility Study conducted in 2009.	N/A	N/A	N/A	
				Bus Transit Service from Bullhead City to SR-95 and I-40 intersection	Implement intercity transit service from Bullhead City to SR-95 and I-40 intersection	N/A	N/A	√	√	N/A	N/A	N/A	N/A	
				Passenger rail along I-40 from SR-95 through Kingman to US-95 to the east	Implement passenger rail service (in Scenarios B and C)	N/A	N/A	√	√	N/A	N/A	N/A	N/A	

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation					Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number		Construction Year*	
2010 Statewide Transportation Framework	March 2010	Arizona Department of Transportation	Recommendations for a Statewide transportation vision were developed from regional framework studies.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Future transportation scenarios were assessed based on five principles: • Improve mobility and accessibility • Support economic growth • Promote sustainable transportation/ land use inks • Consideration of the Environment and Natural Resources • Support Safety and Security
Flagstaff Pathways 2030 Regional Transportation Plan	December 2009	Charlier Associates / Flagstaff Metropolitan Planning Organization	The RTP identifies and prioritizes future transportation investments for the Flagstaff region for driving, riding the bus, walking, biking and goods movement.	I-40 Widening: Bellemont to A-1 Mtn. Rd TI	I-40 Widening: Bellemont to A-1 Mtn. Rd TI	N/A	N/A	√	N/A	N/A	N/A	N/A	N/A	N/A
				I-40 Widening: Woody Mtn. to Lone Tree	I-40 Widening: Woody Mtn. to Lone Tree	N/A	N/A	√	N/A	N/A	N/A	N/A	N/A	N/A
				I-40 Widening: A-1 to Woody Mtn.	I-40 Widening: A-1 to Woody Mtn.	N/A	N/A	√	N/A	N/A	N/A	N/A	N/A	N/A
What Moves You Arizona, Long-Range Transportation Plan 2010-2035	November, 2011	Arizona Department of Transportation	A 25 year transportation plan to guide future investments in transportation. The plan used a combination of technical information and public input to develop a fiscally-constrained Long-Range Transportation Plan.	No specific projects are listed	N/A	N/A	N/A	N/A	Performance Measures Improve Mobility and Accessibility - Percentage of roadway miles at acceptable congestion levels - Average speed during peak periods in urban areas - Total annual (or average daily) hours of delay - Amount of rural highways “improved” System Preservation and Maintenance - Percentage of State System lane miles with “fair” or better pavement conditions - Number of structurally deficient bridges - Percent of required maintenance spending - Percent of rural transit preservation needs met Support Economic Growth - Number of jobs created/retained - Percentage of roadway miles at acceptable congestion levels - Average speed during peak periods in urban areas - Total annual (or average daily) hours of delay - Amount of rural highways “improved” - Resources available to support economic initiatives				

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation				Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number	Construction Year*	
													Link Transportation and Land Use - Percentage of roadway miles at acceptable congestion levels - Average speed during peak periods in urban areas - Total annual (or average daily) hours of delay - Level of improved access management Consider Natural, Cultural, and Environmental Resources - Change in vehicle-related emissions - Level of environmental certification Enhance Safety and Security - Number of fatalities, by mode - Number of crashes, by mode Strengthen Partnerships (Quantitative performance measures are not applicable to this goal area.) Promote Fiscal Stewardship - Relative benefits of investment choices

2.2 Corridor Documents

Corridor-specific documents include planning studies that typically span the entire I-40 corridor. Improvement recommendations from these studies are typically unfunded, but can form the basis for inclusion in state or regional plans and programs. A key document reviewed was the I-40 Multimodal Corridor Profile Study. This study, completed in 1999, provided extensive multimodal improvement recommendations for I-40 in Arizona. Many of the recommendations focused on expansion projects for the I-40 Corridor.

The Strategic Plan for Early Deployment of Intelligent Transportation Systems (ITS) on I-40 (1997) was another major corridor plan that was reviewed and that applied to the entire I-40 Corridor.

Corridor documents are summarized in **Table 4.**

Table 4: Review of Corridor Specific Documents Relating to I-40 Corridor

Name of Study	Date	Prepared by/for	Overview	Recommendations				Status of Recommendation						Performance Measures
				Location or Begin Milepost	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number		Construction Year	
Strategic Plan for Early Deployment of ITS on I-40	May, 1997	Kimley-Horn and Associates / Arizona Department of Transportation	A strategic plan to deploy ITS rural technologies along the I-40 corridor	N/A	Short term: Multimodal I-40 Traveler Information System, including traveler kiosks, Grand Canyon National Park Transit Service and Parking Management System, Traveler Information Radio, Planning, Performance Monitoring, and Evaluation System. Other short term projects recommended were freeway service patrols, and incident and resource management coordination.	N/A	√	N/A	N/A	N/A	N/A	Installation of 511 Statewide Signing	2008	N/A
				N/A	Mid to long term: Automated Vehicle Location and Identification, Slow vehicle/road widening system, emergency notification system	N/A	√	N/A	N/A	N/A	N/A	Installation of VMS Signing at MP 168 and MP 184	2001	
I-40 TTIS (Traveler and Tourist Information System) Tourist Intercept Survey	May, 1998	Battelle / USDOT ITS Joint Program Office	Field Operational Test (FOT) of Traveler Information Services in Tourism Areas. This document describes the methods and procedures to carry out a tourist intercept survey.	N/A	No project-specific recommendations included.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Improve mobility, increase driver awareness, reduce congestion, stimulate economic development, and improve safety.
I-40 TTIS (Traveler and Tourist Information System) Route Diversion Study	May, 1998	Battelle / USDOT ITS Joint Program Office	Test plan to measure how drivers respond to Traveler and Tourism Information System messages by changing routes.	N/A	No project-specific recommendations included.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Improve mobility, increase driver awareness, reduce congestion, stimulate economic development, and improve safety.
I-40 TTIS (Traveler and Tourist Information System) Focus Groups and Personal Interviews	May, 1998	Battelle / USDOT ITS Joint Program Office	This document describes a test plan for interviews of focus groups.	N/A	No project-specific recommendations included.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Name of Study	Date	Prepared by/for	Overview	Recommendations				Status of Recommendation						Performance Measures
				Location or Begin Milepost	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number		Construction Year	
I-40 Multimodal Corridor Profile Study	December, 1999	Lima & Associates and TransCore	This study developed a multimodal program of projects for the entire I-40 corridor in Arizona	**Projects – ADOT Kingman District**										Person trips, • Level of Service, • Travel time, • Impact on travel time, • Safety improvement • Energy consumption impacts, and • Impacts on vehicle operating costs
				MP 37 to MP 44.31	Reconstruct and widen to 6 lanes	N/A	√	√	√	N/A	N/A	N/A	N/A	
				MP 44.31 to MP 55	Reconstruct and widen to 6 lanes	N/A	√	√	√	N/A	N/A	N/A	N/A	
				MP 55 to MP 71.93	Reconstruct and widen to 6 lanes	N/A	√	√	√	N/A	N/A	N/A	N/A	
				MP 91.7 to MP 103.58	Reconstruct and widen to 6 lanes	N/A	√	√	√	N/A	N/A	N/A	N/A	
				MP 144.94 to MP 146.22	Reconstruct and widen to 6 lanes	N/A	√	√	√	N/A	N/A	N/A	N/A	
				MP 81.5 to MP 82.2	Construct climbing lane WB	N/A	√	√	√	N/A	N/A	N/A	N/A	
				MP 83.7 to MP 84	Construct climbing lane WB	N/A	N/A	√	√	N/A	N/A	N/A	N/A	
				MP 125.5 to MP 125.9	Construct climbing lane WB	N/A	N/A	√	√	N/A	N/A	N/A	N/A	
				MP 10 to MP 20	Construct new interchange	N/A	N/A	√	√	N/A	N/A	N/A	N/A	
				MP 37.03	Reconstruct Griffith TI	N/A	√		√	N/A	N/A	N/A	N/A	
				MP 44.31	Reconstruct McConnico TI	N/A	√		√	N/A	N/A	N/A	N/A	
				Between MP 55 and 56	Construct new interchange	N/A	N/A	√	√	N/A	N/A	N/A	N/A	
				MP 49	Reconstruct West Kingman TI	N/A	√	√	N/A	N/A	Kingman TI, widen ramps, Proj. No. IM 40-1(82) TRACS H358001C		1998	
				MP 51.68	Reconstruct Stockton Hill TI	N/A	√	N/A	N/A	N/A	Stockton Hill TI, reconstruct ramps Proj. No. I 40-1-(524) TRACS H412501C		1999	
				MP 53.08	Reconstruct East Kingman TI		√	N/A	N/A	N/A	East Kingman TI, improve ramp operation, Proj. No. I 40-1-512 TRACS H520601C		1999	

Name of Study	Date	Prepared by/for	Overview	Recommendations				Status of Recommendation						Performance Measures
				Location or Begin Milepost	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number		Construction Year	
I-40 Multimodal Corridor Profile Study (Continued)	December, 1999	Lima & Associates and TransCore	This study developed a multimodal program of projects for the entire I-40 corridor in Arizona.	MP 59.65	Reconstruct DW Ranch Road TI	N/A	√	N/A	√	N/A	N/A	N/A	N/A	Person trips, • Level of Service, • Travel time, • Impact on travel time, • Safety improvement • Energy consumption impacts, and • Impacts on vehicle operating costs
				MP 66.47	Reconstruct Blake Ranch Road TI	N/A	√	N/A	√	N/A	N/A	N/A	N/A	
				MP 71.96	Reconstruct Hwy 93 TI	N/A	√	√	N/A	N/A	DCR and EA scheduled for FY 2014.		2014	
											I-40 / US 93 West Kingman TI Final Feasibility Report		2009	
				MP 96.02	Reconstruct Cross Mtn TI	N/A	√	N/A	√	N/A	N/A	N/A	N/A	
				MP 103.58	Reconstruct Jolly Road TI	N/A	√	N/A	√	N/A	N/A	N/A	N/A	
				MP 121 to 130	Construct new interchange	N/A	N/A	√	√	N/A	N/A	N/A	N/A	
				MP 49 to MP 53	Construct new noise barriers	N/A	N/A	N/A	√	N/A	N/A	N/A	N/A	
				MP 3	Construct new rest area	N/A	N/A	N/A	√	N/A	N/A	N/A	N/A	
				Between MP 90 and 94	Construct new rest area	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
				MP 0 to MP 9.79	Reconstruct highway	√	N/A	N/A	N/A	N/A	California border – MP 2.4, mill and replace, Proj. No. IM 040-A(205)A, TRACS H7663 01C		2010	
											MP 2.36 to 8.3, mill and replace, Proj. No. IM 040-A(010)A, TRACS H555401C		2003	
											Lake Havasu TI, MP 8.3-MP 21, pavement preservation Proj. No. IM 040-A(200)A, TRACS H656901C		2009	
											Lake Havasu TI (MP 8.3) to Franconia TI(MP 16), mill and replace, Proj. No. IM 40-1(83), TRACS H390601C		1999	
				MP 71.93 to MP 85	Reconstruct highway	√	N/A	N/A	N/A	N/A	FY 2014 - Pavement Preservation, Jct US 93 to Silver Springs (BMP 72) Design -24714 / D, Construction - 20415 / C		FY 2016	
											Silver Springs(MP 79.5) to Rock Springs (MP 86.2, mill and replace Proj. No. IM 040-B(004)A TRACS H584601C		2004	

Name of Study	Date	Prepared by/for	Overview	Recommendations				Status of Recommendation						Performance Measures
				Location or Begin Milepost	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number		Construction Year	
I-40 Multimodal Corridor Profile Study (continued)	December, 1999	Lima & Associates and TransCore	This study developed a multimodal program of projects for the entire I-40 corridor in Arizona.	MP 84 to MP 85	Reconstruct highway	√	N/A	N/A	N/A	N/A	Silver Springs(MP 79.5) to Rock Springs (MP 86.2, mill and replace Proj. No. IM 040-B(004)A TRACS H584601C		2004	Person trips, • Level of Service, • Travel time, • Impact on travel time, • Safety improvement • Energy consumption impacts, and • Impacts on vehicle operating costs
				MP 103.1 to MP 110.5	Reconstruct highway	√	N/A	N/A	√	N/A	N/A	N/A	N/A	
				MP 123.4 to MP 144.94	Reconstruct highway	√	N/A	N/A	√	N/A	N/A	N/A	N/A	
				Projects – ADOT Flagstaff District										
				MP 157 to MP 205	Reconstruct and widen to 6 lanes	N/A	√	√	N/A	EA (March 2011) Initial DCR, I-40, Bellemont TI to Winona TI, MP 183-214	N/A	N/A	N/A	
				MP 194.7	Construct climbing lane WB	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
				MP 157.77	Reconstruct Devil Dog TI	N/A	√	√	√	N/A	N/A	N/A	N/A	
				MP 161.96	Reconstruct W. Williams TI	N/A	√	√	√	N/A	N/A	N/A	N/A	
				MP 163.54	Reconstruct Grand Canyon Blvd TI	N/A	√	√	√		N/A	N/A	N/A	
				MP 166	Reconstruct East Williams TI	N/A	√	√	√	N/A	N/A	N/A	N/A	
				MP 167.52	Reconstruct Garland TI	N/A	√	√	√		N/A	N/A	N/A	
				MP 171.65	Reconstruct Pittman TI	N/A	√	√	√	N/A	N/A	N/A	N/A	
				MP 178.18	Reconstruct Parks TI	N/A	√	√	√		N/A	N/A	N/A	
				MP 185.11	Reconstruct Transwestern TI	N/A	√	√	√	N/A	N/A	N/A	N/A	
				MP 190.54	Reconstruct A-1 Mountain TI	N/A	√	√	√		N/A	N/A	N/A	
				MP 191.67	Reconstruct W. Flagstaff TI	N/A	√	√	N/A	N/A	W. Flagstaff TI Improvement, Proj. No. I 040-C-500, TRACS H537401C		2001	
				MP 192.56	Reconstruct Dairy Road TI	N/A	√	√	√	N/A	N/A	N/A	N/A	
				MP 195.42	Reconstruct I-17 TI	N/A	√	√	√	N/A	I-40 and I-17 TI Phase 1 Modification, Proj. No. ACNH 40-3(71),TRACS H267601C		1999	
						N/A	√	√	√	N/A	I-40 and I-17 TI Phase II, construct roadway, 1.43 mi, Proj. no. ACNH 40-3(87)A, TRACS H267602C		1999	

Name of Study	Date	Prepared by/for	Overview	Recommendations				Status of Recommendation					Performance Measures
				Location or Begin Milepost	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number	Construction Year	
I-40 Multimodal Corridor Profile Study (continued)	December, 1999	Lima & Associates and TransCore	This study developed a multimodal program of projects for the entire I-40 corridor in Arizona.	MP 195 to MP 205	Construct Noise Barriers	N/A	√		√	N/A	N/A	N/A	Person trips, • Level of Service, • Travel time, • Impact on travel time, • Safety improvement • Energy consumption impacts, and • Impacts on vehicle operating costs
				MP 146.25 to MP 148	Reconstruct highway	N/A	N/A	N/A	N/A	N/A	County line (MP 147.4) to Davenport Lake (MP 148.9, mill and replace, Proj. no. NON 040-C-504, TRACS H688801C	2006	
				MP 154 to MP 157	Reconstruct highway	N/A	N/A	N/A	N/A	N/A	Micro seal, MP 150-191.8, Proj. no. ARRA 040-C(203)A, TRACS H7845 01C	2010	
											Welch OP (MP 152.1) to Devil Dog (MP 158.6), mill and replace, Proj. no. IM 040-C(004)B, TRACS H52450	2003	
				N/A	Transit services in urban and rural areas need to be expanded. Increase intercity public transportation.	N/A	N/A	√	N/A	N/A	Transit service has increased in the Flagstaff area over time.	Ongoing	
				Vicinity of Flagstaff and Kingman	When segments are widened to six lanes, in Flagstaff and Kingman, design the roadway, bridges, interchanges, and appurtenances to accommodate eight lanes in the future.	N/A	√	√	N/A	N/A	N/A N/A	N/A	
				Flagstaff	A Flagstaff TOC should be implemented to operate and coordinate the ITS facilities.	√	N/A	N/A	√	N/A	N/A N/A	N/A	
					Implement ITS facilities to monitor weather conditions, provide information to motorists, and monitor traffic movement and speed.	√	N/A	N/A	N/A	N/A	N/A Installation of 511 statewide signing – Proj. No. IT 020-4(511)A, TRACS H626201C	2008	
											VMS installation at MP 168, 184, 199, Proj. No. N 900-0-515, H429504C	2001	
					Implementation of systems to detect roadway hazards and the installation of security devices to monitor rest stops and other roadway facilities.	√	N/A	N/A	N/A	N/A	N/A N/A	N/A	
					Define a comprehensive winter maintenance strategy.	√	N/A	N/A	N/A	N/A	N/A N/A	N/A	
					Establish an incident management team.	√	N/A	N/A	N/A	N/A	N/A N/A	N/A	
					Provide information on detours using ITS, information kiosks, and radio.	√	N/A	N/A	N/A	N/A	N/A VMS installation at MP 168, 184, 199, Proj. No. N 900-0-	2001	

Name of Study	Date	Prepared by/for	Overview	Recommendations				Status of Recommendation						Performance Measures
				Location or Begin Milepost	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number		Construction Year	
I-40 Multimodal Corridor Profile Study (continued)	December, 1999	Lima & Associates and TransCore	This study developed a multimodal program of projects for the entire I-40 corridor in Arizona.									515, H429504C		
					Restrict trucks to right lane on steep grades. Investigate practices of other states and prepare draft legislation for this strategy.	√	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
					Investigate public/private partnerships to develop more truck stops.	√	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
					Construct bicycle facilities on and of interstate right-of-way and crossing the interstate.	√	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
					Increase long distance rail/truck intermodal trips and increase long distance rail/truck intermodal strategies.	√	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
					Freight-specific projects include: Topock POE improvements, truck climbing lanes, reconstruct Sanders POE, other POE improvements, improve turning radii for trucks on access road at Flagstaff Freight Depot.	√	√	√	N/A	N/A	Topock Port of Entry Initial Project Assessment completed November, 2013		N/A	N/A
Arizona Transparency Report - 2012 Annual Report	Sept. 2012	Arizona Department of Transportation Traffic Safety Section	States are required to report annually on locations on the state highway system with the most severe safety needs. I-40 westbound, MP 49-49.9, was identified as a location.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Top five percent location with highest safety needs based on: Location should have at least one fatal crash in the three year reporting period. Location should have at least one crash every year in the three year reporting period. Total number of fatal or incapacitating injury crashes must be equal to or greater than two in the three year reporting period.
				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
				N/A	N/A	N/A	N/A	N/A	√	N/A	Bridge deck rehabilitation projects planned for 22 structures in STIP (see pages 8-10 for details)		N/A	

2.3 Location Specific Documents

Location specific documents on I-40 are typically project scoping documents which provide specific information for programming as well as to guide the subsequent stages of the ADOT Project Development Process.

Several types of project scoping documents were reviewed for the I-40 Corridor: Project Assessments, Design Concept Reports, and Feasibility Reports.

Project Assessments represents a formal process by which the Highway Development and Highway Operations Groups reach initial consensus on project scope, cost, and schedule. Unless major unforeseen circumstances occur, this early consensus is considered binding throughout the project development process.

A Design Concept Report or Location Design Concept Report is prepared for projects where the location or the design concept is an issue. Environmental documents are typically prepared as part of Design Concept Reports. These reports typically further define project parameters when they cannot be fully addressed by a Project Assessment. Once approved, a Design Concept Report is considered binding throughout the project development process.

A Feasibility Report is prepared for major projects where design concept is an issue. Feasibility Reports may be similar to Design Concept Reports but may require fewer technical reports and is not prepared in conjunction with an Environmental Document.

On I-40, the following location specific documents were reviewed:

- Initial Design Concept Report, I-40, Bellemont Road to Winona
- I-40/US 93 West Kingman TI Final Feasibility Report
- Topock Port of Entry Initial Project Assessment
- I-40, Kingman Crossing Traffic Interchange Final Design Concept Report
- I-40 Rattlesnake Wash Traffic Interchange, Final Design Concept Report

Other location specific documents reviewed were Categorical Exclusions, which are environmental reviews that are completed for projects that do not include significant environmental impacts. Categorical exclusions were reviewed for:

- I-40 Rattlesnake Wash Traffic Interchange, Categorical Exclusion
- I-40, Kingman Crossing Traffic Interchange, Categorical Exclusion

These documents are summarized in **Table 5**.

Table 5: Review of Location Specific Documents Relating to I-40 Corridor

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation					Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number		Construction Year	
Initial Design Concept Report, I-40, Bellemont Road to Winona	February, 2011	Stanley Consultants/ Arizona Department of Transportation	This report is a Design Concept Report for the addition of capacity to I-40 from the Bellemont traffic interchange to the Winona traffic interchange	West of the Bellemont TI at MP 183 to east of the Winona TI at MP 214.	Widen mainline I-40 to three lanes in each direction	N/A	N/A	√	N/A	N/A	N/A	N/A	N/A	N/A
					Spot improvements to address super-elevation, vertical stopping sight distance and grade issues	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
					Widening and replacing bridges	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
					Reconstructing existing interchanges	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
					Constructing four new interchanges.	N/A	N/A	√	N/A	N/A	N/A	N/A	N/A	N/A
I-40/US 93 West Kingman TI Final Feasibility Report	October 2009	Kimley-Horn and Associates / Arizona Department of Transportation	This study identifies possible corridor alternatives for a new system-to-system directional interchange connecting I-40 to US 93 near Kingman, AZ	Vicinity of West Kingman TI (also known as Beale Street TI)	Corridor Alternatives C and D were identified as the preferred corridors. Alt C was a corridor developed along the existing Beale Street (US 93) alignment as an elevated viaduct alternative within the urbanized section north of existing Beale St TI. Corridor Alternative D was developed north of the existing Beale Street TI following the least severe terrain and the shortest distance connecting I-40 and US 93 serving the predominant movement (WB I-40 to NB US 93 and SB US 93 to EB I-40). A DCR and Environmental Assessment were recommended.	N/A	N/A	√	N/A	N/A	N/A	N/A	N/A	Evaluation criteria in the study included traffic and environmental considerations.

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation					Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number		Construction Year	
Topock Port of Entry Initial Project Assessment	November 2013	Kimley- Horn and Associates / Arizona Department of Transportation	The purpose of this project is to improve the efficiency and effectiveness of the motor carrier enforcement operations for the Interstate 40 (I-40) ADOT POE located near the community of Topock, Arizona. The project will provide a new state-of-the-art POE facility located at its existing site and improve traffic operations along I-40 at milepost (MP) 4.	Milepost 4	Recommended. Improvements include: Operations building Truck inspection building Two credential check booths. A bypass lane and oversized vehicle lane. Improved entrance and exit ramp geometry. Increased truck and car parking stalls with security camera monitoring. Designated truck axle load adjustment parking stalls and out-of-service truck parking stalls. Improved vehicle circulation. A new static platform truck scale. Designated hazardous materials/leaking load containment basin. PREPASS and WIM sorting systems upstream of the POE on EB and WB I-40 mainline. Communications upgrades and closed circuit video systems to link POE operations. Dynamic message signs, signals, lighting and pavement markings for driver communications. Truck parking canopies. Implementation of automatic license plate reader, USDOT number readers and vehicle waveform identification systems.	N/A	N/A	N/A	N/A	N/A	N/A	Preliminary engineering for unspecified improvements to Topock POE. $1M in FY2015.	N/A	N/A

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation					Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number		Construction Year	
I-40, Kingman Crossing Traffic Interchange Final Design Concept Report	2010	URS Corporation / Arizona Department of Transportation	Design Concept Report for the construction of a new traffic interchange at MP 55, 1.5 miles east of existing Kingman TI.	55	The project includes construction of a new traffic interchange and a new arterial street, Kingman Crossing Blvd, between the TI and Santa Rosa Drive. Traffic interchange planned to extend from MP 54.3 to MP 55.9.	N/A	N/A	√	√	Categorical Exclusion approved 9/2009	N/A	N/A	N/A	Evaluation criteria for TI alternatives includes costs, roadway geometry and safety, traffic operational impacts, right-of-way, earthwork, drainage, structures, impacts to I-40,utilities, and environmental.
I-40, Kingman Crossing Traffic Interchange, Categorical Exclusion	2009	EcoPlan Associates, Inc. / Arizona Department of Transportation	Design Concept Report for the construction of a new traffic interchange at MP 55, 1.5 miles east of existing Kingman TI.	55	Categorical Exclusion for planned new I-40 Traffic Interchange at MP 55.	N/A	N/A	√	√	Categorical Exclusion approved 9/2009	N/A	N/A	N/A	N/A
I-40 Rattlesnake Wash Traffic Interchange, Final Design Concept Report	2007	URS Corporation in association with EcoPlan / Arizona Department of Transportation	Design Concept Report for the construction of a new traffic interchange at MP 56.6, three miles east of existing Kingman TI. This was later renamed Rancho Santa Fe Parkway.	56.6	The project includes construction of a new traffic interchange as well as a new arterial street to connect to the new traffic interchange. The project would involve cost –sharing agreements between ADOT and the City of Kingman. Traffic interchange planned to extend from MP 55.5 to MP 57.2.	N/A	N/A	√	√	Categorical Exclusion approved 9/2007	N/A	N/A	N/A	Evaluation criteria for the TI alternatives includes costs, roadway geometry and safety, traffic operational impacts, right-of-way, earthwork, drainage, structures, impacts to I-40,utilities, and environmental.
I-40 Rattlesnake Wash Traffic Interchange, Categorical Exclusion	2007	EcoPlan Associates, Inc. / Arizona Department of Transportation	Categorical Exclusion	56.6	Categorical Exclusion for planned new I-40 Traffic Interchange at MP 56.6.	N/A	N/A	√	√	Categorical Exclusion approved 9/2007	N/A	N/A	N/A	N/A

2.4 Mode Specific Documents

Mode specific documents that were reviewed include studies related to transit, bicycle, pedestrian, railroad, and freight.

Transit plans include the regional transit coordination plans that were developed by the NACOG and the WACOG. The purpose of these plans is to address federal planning requirements for a coordinated public transit-human services transportation plan. The plans should maximize transportation availability by matching services with areas where there are needs and minimizing the duplication of services.

The key document reviewed for bicycle and pedestrian transportation was the Statewide Bicycle and Pedestrian Plan (2013), which addresses the most critical bicycle and pedestrian needs on the state highway system.

Primary reference sources for rail transportation were the Arizona State Rail Plan (2011), which is a comprehensive assessment of the state's rail needs. A supporting document for this plan was the Statewide Rail Framework Study (2010).

Freight transportation document reviews involved not only the Arizona Multimodal Freight Analysis Study (2007) , which provided strategic recommendations for statewide freight planning, but a number of reference sources used in the development of freight databases and performance measures.

The ADOT Ports of Entry Study (2013) provided not only current conditions and future forecasts of truck traffic at land ports of entry on I-40, but also provides phased improvements recommendations at each port.

These documents are summarized in **Table 6**.

Table 6: Review of Mode Specific Documents Relating to I-40 Corridor

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation					Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number		Construction Year	
Northern Arizona Regional Human Services & Public Transportation Coordination Plan	2014	Northern Arizona Council of Governments	The purpose of this document is to address federal planning requirements for a coordinated Public Transit-Human Services Transportation Plan.	N/A	Coordination strategies between transit agencies were provided. The report also listed transit capital projects by funding source.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Western Arizona Regional Transportation Three Year Coordination Plan Update, 2014-2015	2013	Western Arizona Council of Governments	The Coordination Plan Update was developed in response to federal legislation requiring agencies that receive federal funding comply with their local Coordination Plan.	N/A	General gaps in transit service were identified, which included a need for transit service in the Topock-Golden Shores area (near the western limits of I-40) and a need for a transit coordinator for the Hualapai Tribe.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A Coordinated Transit Plan for Economic Collaborative of Northern Arizona (ECoNA) in Northern Arizona	2014	LSC Transportation Consultants / Community Transportation Association of America (CTAA)	This study developed a coordinated public transportation service plan in the corridor extending from the South Rim of the Grand Canyon to Williams and east to Flagstaff.	N/A	Elements of the plan include: • Employee vanpools • Park and ride lots • Williams to Flagstaff medical trips • Williams to Flagstaff commuter route • Williams to Grand Canyon vanpools • Williams to Grand Canyon Commuter route • Williams Circulator	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Statewide Bicycle and Pedestrian Plan Update	June 2013	Kimley- Horn / ADOT	The purpose of the 2012 ADOT Bicycle and Pedestrian Plan Update (Plan) is to update the 2003 plan and address the most critical bicycle and pedestrian transportation planning needs on the State Highway System (SHS). Plan recommendations are in three areas: Policies and Plans, Education, Encouragement and Evaluation, and Bicycle and Pedestrian Infrastructure.	N/A	Key strategies: • Support local and regional agencies/jurisdictions to establish connectivity and alternative routes to state highways; • Collaborate with local and regional jurisdictions to implement infrastructure along and crossing state highways consistent with local bicycle and pedestrian plans; • Coordinate with US Forest Service, National Park Service, and Arizona State Parks to ensure that bicycle and pedestrian facilities connect state highways to forests and national parks; • Implement the proposed US Bicycle Route System in Arizona.	N/A	N/A	N/A	N/A	N/A	AASHTO U.S. Bicycle Route System Study (Task Assignment MPD 068 -14) is currently underway. One corridor being evaluated is U.S. Route 66. Route 66, east of Ash Fork, has been integrated into I-40.	N/A	N/A

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation				Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number	Construction Year	
SCAG Goods Movement Truck Count Study	September 2002	VRPA Technologies/ SCAG	Truck count study intended to address some of the shortcomings of Caltrans truck counts for SCAG regional freight planning purposes and develop an ongoing truck data collection program. Interstate 40 near the Arizona line was considered as a location of interest for understanding regional truck flows, but new counts were not collected and the study only considers trucks entering CA.	California	Does not recommend transportation improvements; this is a planning study focusing on developing better truck count data to inform regional decision making.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A – Likely of little use given the age of the data and the study focus on CA.
Assessment of Out of State Heavy Duty Truck Activity Trends in California	March 14, 2008	Nicholas Lutsey, UC-Davis/CARB	Assesses the impact on air quality in California of interstate trucks that are registered and/or fuel out of state. Includes average daily counts of trucks entering CA from AZ on I-40 (all trucks and 5+ axle) from various sources, but all are somewhat dated. Also collected truck intercept surveys on I-40 WB in Needles, CA.	I-40 at California border	Does not recommend transportation improvements. Planning study focused on evaluating the air quality impacts of out of state trucks in California.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A – Likely of little use based on the age of the truck counts, the focus on CA, and the lack of an emissions assessment.
Arizona Multimodal Freight Analysis Study	2007	ADOT	Statewide freight study that analyzes the state's freight dependent industries, assesses the multimodal transportation network, and provides strategic recommendations for statewide freight planning.	Statewide	Does not recommend specific projects, but includes policy recommendations, suggested studies, and freight performance measures.	N/A	N/A	N/A	N/A	N/A	Selected measures: • Average truck trip time between trade centers • Average travel time and buffer indices for major truck corridors • % of priority truck routes meeting key ADOT standards • Climbing lanes for trucks • Time savings from ITS investments on priority truck corridors • CMV crash rates by segment • Pavement and bridge maintenance savings from weight enforcement • % of public truck parking spaces occupied by time of day • Distance between public truck parking facilities • Reductions in emissions/ energy use/VMT from large trucks		

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation				Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number	Construction Year	
Arizona State Rail Plan	2011	ADOT	Comprehensive assessment of the state's rail needs. Identifies the current rail system, determines infrastructure needs, and sets out program to include rail in the state's long-range planning processes to improve regional and statewide safety and mobility.		Route 66 corridor includes I-40 and BNSF Transcon. AZ Spine Corridor intersects the Route 66 Corridor in northern AZ. AZ Spine: Proposed intercity rail corridor along the AZ Spine would travel between Phoenix and Flagstaff. Rail plan calls for a feasibility study. Operational improvements to BNSF Phoenix Subdivision between PHX and Williams Junction. Plan does not offer specifics. Route 66: BNSF is planning to triple track the Transcon when traffic warrants it. Intermodal logistics centers proposed near Flagstaff/Kingman Also, proposed Interstate corridor between PHX and Las Vegas would intersect I-40 near Kingman.	N/A	√	√	N/A	N/A	N/A	N/A	N/A
Statewide Rail Framework Study	2010	ADOT	Supporting document for the Arizona State Rail Plan. Includes existing conditions review, freight and passenger forecasts, BNSF statewide system/operations and proposed strategic opportunity, and proposed implementation actions.	Statewide	Proposed strategic opportunity is to facilitate capacity improvements to the BNSF Transcon; implement safety improvements along it; identify infrastructure solutions to alleviate heavy freight traffic through communities along the line; and mitigate habitat fragmentation/ enable wildlife migration. Safety improvements recommended for grade crossings at San Francisco Street and Enterprise Road in Flagstaff, and Navajo Blvd in Holbrook. Bypass around Flagstaff recommended, using I-40 ROW. Flyovers and quiet zones recommended for Winslow and Holbrook. Wildlife crossings recommended at key points of sensitive habitat.	N/A	N/A	N/A	N/A				N/A

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation				Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number	Construction Year	
ADOT Ports of Entry Study	2013	Cambridge Systematics/ ADOT	Evaluates current conditions and forecasts future truck traffic for all of Arizona's commercial vehicle ports of entry (not including international land POEs). Identifies needs and deficiencies for each POE and develops phased improvement packages based on needs and expected future truck traffic. Includes 3 basic Concepts of Operation for fully staffed, partially automated, and fully automated POE operations. Has recent counts and forecasts of truck flows at the I-40 ports of entry. Topock inbound and Sanders inbound are recommended to be fully staffed POEs. Topock outbound and Sanders outbound would be 'virtual supported' facilities featuring mainline screening, secondary sorting, and interactive kiosks for driver self-service and connection to remote ADOT staff.	Statewide ports of entry	Short term investments for both POEs: mainline screening technology. Medium term investments for both POEs: Other technology investments like scales, booths, kiosks, ramp sorting, signage, signals. Medium term investments for Sanders: Physical improvements e.g. land acquisition, ramp/lane improvements, etc. Long term improvements for Topock: Physical improvements (as above).	N/A	√	√	N/A	Preliminary engineering for unspecified improvements to Topock POE. $1M in FY2015. Preliminary engineering for ROW, utilities, environmental, and POE reconstruction at Sander POE. $2M in FY2013. Environmental assessment has been completed for Sanders.	N/A	N/A	N/A
Freight Analysis Framework	2013	FHWA	Commodity flow origin-destination database that estimates current and forecasts future freight flows to, from, and within AZ by mode and commodity. Estimates by tons, ton-miles, and value. Long-haul truck flows can be mapped. Can also estimate through flows using assumptions about O-D pairs likely to involve travel through AZ.	N/A	N/A – This is a database for use in assessing current and future freight flows.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Does not specifically measure performance but may be useful in developing freight performance measures for I-40.
Transamerica Transportation Corridor Feasibility Study	1994	Wilbur Smith Associates/ Transamerica Transportation Corridor Steering Committee	Feasibility assessment for a proposed multimodal corridor that would stretch from the Mid-Atlantic region to California, potentially traversing northern AZ.	N/A	Evaluates a range of corridor-wide options including new technologies, a conventional Interstate Highway, a super highway, and a truckway. Also provides basic costing information. Does not make specific recommendations.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Of limited use due to age and lack of focus on I-40.

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation				Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number	Construction Year	
National Performance Management Research Data Set	2013	FHWA	National data set of average travel times for use in performance measurement. This data set is available to States and Metropolitan Planning Organizations (MPOs) to use for their performance management activities. Data are available monthly and must be requested by states and MPOs. Includes passenger and freight data.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Potentially useful in developing performance measures for the I-40 corridor, including average truck speeds. ADOT is coordinating a formal request for this data.
Travel Time in Freight Significant Corridors	2007	FHWA	Report presenting initial research findings based on the first full year of truck speed data for five freight-significant corridors, but I-40 is not one of them.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Average truck speeds calculated by segment based on time stamped GPS pings. Speeds of multiple trucks are aggregated to develop average speeds per segment. Refueling, deliveries, and HOS stops are excluded. Speeds are used to calculate travel time reliability using a buffer index approach similar to that developed by TTI, assuming a 95% on-time arrival rate.
Freight Performance Measures Web Based Tool (FPMWeb)	Ongoing	FHWA	Web-based data processing tool that calculates average operating speeds for trucks on Interstate highways based on confidential onboard data. Users must request an account. Developed by ATRI in partnership with USDOT.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Truck speeds on I-40 in AZ averaged more than 55 mph in 2010, according to a map published on FHWA's web site.

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation				Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number	Construction Year	
			Contains data for I-40.										
STB Carload Waybill Sample	2012	State Trans. Board	Rail-specific commodity flow database describing the weight of rail shipments by commodity, revenue received by railroads for transporting them, and specific rail origins, destinations, and through trips.	N/A	N/A – This is a database that may be useful for assessing rail flows in the I-40 corridor, but it must be requested from STB by ADOT and is subject to strict non-disclosure requirements.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Does not specifically measure performance but may be useful in developing freight performance measures for I-40 corridor, if they are needed for the rail mode.
NCFRP Report 10: Performance Measures for Freight Transportation	2011	Gordon Proctor and Associates/ National Cooperative Freight Research Program	Research project undertaken to develop comprehensive performance measures for the U.S. freight transportation system. Measures are presented as a Freight System Report Card, which has three levels of increasingly detailed information to serve the needs of a wide variety of stakeholders. The Report Card includes 29 performance measures in six categories, and reflects different levels of geographic detail from the local to the global perspective. The six categories are: demand, efficiency, system condition, environmental impacts, safety, and the adequacy of investments in the freight system. Performance measures were chosen based largely on the availability of reliable data, as it is recognized that freight performance measurement is challenging.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Proposed performance measures: **Freight demand measures:** • Volume, all modes • Truck freight volumes • Rail freight volumes • Inland water freight volumes • Containerized marine freight volumes **System efficiency measures**: • Interstate highway speeds • Travel speeds at top Interstate highway bottlenecks • Interstate highway reliability • Class I RR operating speed • Cost of logistics as a percent of GDP **System condition measures**: • NHS pavement conditions • NHS bridge conditions **Environmental condition measures**: • Freight-produced GHG emissions • Truck GHG emissions • Rail GHG emissions • Freight-produced ozone-related emissions • Truck-related VOCs • Truck-related NOX emissions • Rail NOX emissions • Rail VOC emissions • Truck particulate emissions • Ship produced NOX and PM Freight safety measures: • Truck injury and fatal crashes • Highway/rail at-grade crashes **System investment measures**: • Estimated investment in NHS to sustain conditions • Rail freight industry earning cost of capital • Estimated rail capital investment to sustain

Name of Study	Date	Prepared by/for	Overview	Recommendations					Status of Recommendation				Performance Measures
				Location or Begin MP	Description	Preservation	Modernization	Expansion	No Action	Environmental Document	STIP Year and Project Number	Construction Year	
											• market share • Inland waterway investment to sustain lock and dam average age < than 50 years		

2.5 Projects Constructed from 1999 to 2013

Projects that were constructed from 1999 to 2013 were summarized using information from ADOT as-built projects contained in the Master As-Built list dated November 2013. Projects constructed during this time period focused strongly on system preservation and modernization. A listing of constructed projects is provided in **Table 6**. A graphical summary of preservation, modernization, or expansion projects is shown in **Figure 4.**

An overview of the projects are:

Roadway projects:

- Roadway preservation projects – mill and replace or pavement preservation projects were conducted at twenty-four locations.
- Construct climbing lanes – two locations (milepost 87.67- 89.91 and 153.2- 156.17)
- Shoulder improvement – one location (milepost 177 to 182)

Traffic interchange improvements:

- West Yucca TI
- East Kingman TI
- Stockton Hill TI
- Crookton TI
- West Flagstaff TI
- I-17 / I-40 TI – two projects
- Minor TI improvement programs were listed in 1999 for the Flagstaff District and for East Kingman.

Bridge projects:

- Scour retrofit – ten projects
- Bridge or bridge deck rehabilitation – three projects
- Bridge deck replacement – three projects
- Bridge seismic retrofit – three projects

Intelligent transportation system (ITS) projects:

- Installation of 511 signing
- Variable message sign installation at MP 168, 184,199
- I-40 Dynamic Message Signs (statewide project)

Port of Entry projects

- The Topock Port of Entry Weigh–in-Motion devices (designed to capture and record weights as vehicles drive over a measurement site)

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Safety projects:

- Rumble strips installation (milepost 0.2 to 191.1)
- Interstate light pole replacement (a statewide project)
- Fencing installation or replacement – three projects
- Guardrail extension – one project
- Rockfall containment – one project

Signing projects

- Three signing rehabilitation projects

Traffic control:

- Replace lighting pull boxes and load center cabinets (milepost 161.06 to 288.26).

Other projects:

- Crookton rest area improvements
- Pathway and landscaping projects

Table 7: Projects Constructed on I-40 Corridor Since 1999

	TRACS Number	Begin Milepost	End Milepost	As- Built Date	Description	Type of Project
ARRA 040-A(208)A	H7809 01C	0		2009	State line-Oatman, install new barbed wire fence.	Modernization
HES 999-A(001)A	H6388 01C			2005	Interstate light pole replacement statewide	Modernization
I 040-A-509	H6010 01C	0	59.7	2003	Topock TI to McConnico TI, sign rehabilitation	Preservation
N 900-0-539	H483303C	0	0	1999	Flagstaff District (I-17, I-40) Minor TI Improvement Program	Modernization
N 900-A-514	HX125 01C	0	0	2003	Kingman District, seven locations-revamp traffic signals	Modernization
TEA 040-A-(002)A	H5519 01C	0	0	2003	I-40, Mohave Wash Pathway, pathway and landscaping	Modernization
IM 040-A(205)A	H7663 01C	0	2.4	2010	California border-MP 2.4, mill and replace	Preservation
I 040-A-507	H561101C	0.18	0.48	2003	I-40, Colorado River-Topock, guardrail extension	Modernization
STP 040-A-(3)A	H5836 01C	0.2	191.1	2002	Rumble strip construction, MP 0.2-191.1	Modernization
IM 040-A(010)A	H5554 01C	2.36	8.30	2003	Mill and replace, MP 2.36-8.30	Preservation
I 40-A-501	H5771 01C	3.0		2002	Topock Port of Entry, install WIM	Modernization
IT 020-4(511)A	H626201C	5.0	0	2008	Installation of 511 Statewide Signing - 9 Locations	Modernization
IM 040-A(200)A	H6569 01C	8.3	21.0	2009	Lake Havasu TI, pavement preservation	Preservation
IM 40-1(83)	H390601C	8.3	16.0	1999	Lake Havasu TI-Franconia TI, mill and replace, 7.7mi.	Preservation
BR 040-A(207)A	H7420 01C	9.78	10.78	2010	Lake Havasu TI UP #1586 , bridge deck rehabilitation	Modernization
IM 040-A(210)A	H6923 01C	11	12	2010	Boulder Wash and Chemehuevi Wash Bridges, scour retrofit	Preservation
I 040-A-500	H5759 01C	13	14	2002	Franconia Wash Bridge, EB-WB, scour retrofit	Preservation
IM 40-1(85)		14	33		Franconia TI-Walnut Creek, 19 mi., scour retrofit	Preservation
BR 040-A(206)A	H727201C	14.62	15.24	2011	Buck Mountain Wash, bridge rehabilitation	Modernization
BR 40-1-(87)P	H4873 01C	15.0	15.5	1999	Buck Mountain Wash, scour retrofit, MP-15-15.5	Preservation
I 040-A-512	H6501 01C	18	18	2005	Illavar Wash Bridge EB, scour retrofit	Preservation
IM 040-A(209)A	H721201C	21	32.94	2011	MP 21 to 32.94, Walnut Creek, mill and replace	Preservation
STP 040-A-(1)A	H5483 01C	25.06	25.06	2002	West Yucca TI, reconstruct ramps and frontage road	Modernization
O4O-A-NFA	H7568 01C	39	39	2009	Topock-Kingman, pavement rehabilitation	Preservation
I 040-A-513	H6500 01C	46	47	2005	Holy Moses Wash Bridges EB and WB, scour retrofit	Preservation
I 040-A-514	H6622 01C	46.5	48.00	2004	Holy Moses Wash, mill and replace	Preservation
IM 040-A(203)A	H752e 01C	46.55	46.55	2009	Holy Moses Wash - Rattlesnake Wash, pavement preservation	Preservation
I 040-A-510	H6207 01C	46.71	46.71	2003	Holy Moses Wash and East Kingman TI OP at MP 53.63, bridge repair	Preservation

	TRACS Number	Begin Milepost	End Milepost	As- Built Date	Description	Type of Project
BR 040-A(213)A	H799201C	49	49	2011	Topock – Kingman, scour retrofit	Preservation
I-0 040-A-504	H519001	50.34	50.34	2002	Topock-Kingman Hwy (I40) Kingman, fence remove and replace	Preservation
I 40-1-(524)	H412501C	51.49	51.49	1999	Stockton Hill Rd TI, reconstruct ramps	Modernization
IM 40-1(88)P	H412502C	51.49	51.70	2001	Stockton Hill Road, intersection improvement	Modernization
TEA 040-A(007)A	H6052 01C	51.7	52.29	2007	Stockton Hill Rd to Harrison St, pathway landscape	Preservation
TEA 040-A-(008)A	H5612 01C	51.7	52.27	2004	Beverly (Stockton-Harrison), left turn lanes	Expansion
I 040-A-505	H5648 01C	52	52	2003	Mohave Wash rechannelization	Modernization
TEA 900-6(1)P	H494101C	52.22	52.82	2000	Beverly Ave, Kingman, construct pathway	Modernization
I 40-1-512	H520601C	52.95		1999	East Kingman TI, improve WB off ramp operation	Modernization
N 900-0-541	H483305C	53.08	123.30	1999	Minor TI Improvement Program, E. Kingman, minor improvements	Modernization
ARRA 040-B(205)	H7806 01C	53.8	57.95	2009	Railroad Ave-Rattlesnake Wash, fence	Modernization
I 040-B-503	H5990 01C	59	61	2004	Frees Wash Bridge, scour retrofit	Preservation
IM 040-B(200)A	H6824 01C	73.38	0	2012	Peacock Wash, Silver Springs Rd. TI (EB), mill and replace	Preservation
IM 040-B(004)A	H584601C	79.5	86.2	2004	Silver Spring-Rock Springs, mill and replace	Preservation
NON 040-B-NFA	H6760 01C	83.2		2010	Willow Creek Bridges, deck rehabilitation	Preservation
BR 040-B(204)A	H7330 01C	85.89	85.89	2011	Kingman / Ash Fork, bridge deck replacement	Modernization
ACIM 40-2(122)P	H420801C	86.23	103.10	2000	Willow Creek-Jolly Rd, pavement preservation, mill and replace	Preservation
NH 040-B(002)A	H4583 01C	87.67	89.91	2004	Round Valley-Fort Rock EB, construct climbing lane	Expansion
IM 040-8(1)	H533501C	107.6	108.7	2000	Markham Wash Bridge, EB & WB-Bridge Deck Replacement	Modernization
I 40-2-512	H494301C	107.61	107.61	2001	Jolly Rd-Anvil, rock-gabion wire rockfall containment	Modernization
NON 040-B-NFA	H694B 01C	112	113.48	2009	Audley OP, EB & WB, retrofit	Modernization
IM 040-8(201)A	H6568 01C	123.3	132.04	2010	Seligman to Crookton (WB), mill and replace	Preservation
S 999-A-508	H6608 02C	123.9	123.9	N/A	I-40 Dynamic Message Signs, Phase 7 Statewide	Modernization
40-2(119)P	H445501C	126	126	1999	Sign Rehabilitation	Preservation
I 040-B-500	H5334 01C	130.81	132.12	2001	Crookton Rest Area	Modernization
I 040-B-504	H6265 01C	136.7	136.7	2004	Seligman – Crookton, mill and replace AC	Preservation
IM 40-2(120)	H390801C	139	144.27	2000	Pineveta-Ashfork , 5.27 mi , mill and replace AC overlay	Preservation
I 040-B-505	H6266 01C	139.2	139.8	2004	Crookton TI, 0.6 mi, mill and replace AC	Preservation

	TRACS Number	Begin Milepost	End Milepost	As- Built Date	Description	Type of Project
I 040-B- 506	H6447 01C	142.5	142.5	2005	Partridge Creek, scour retrofit	Preservation
NFA 040-B-NFA	H6949 01C	142.5	143	2009	Partridge Creek bridges, EB and WB, bridge deck replacement	Modernization
T 040-B-5	H5531 01C	143.77	144.79	2001	Bridge deck rehabilitation ATSF, 1.02 mi	Modernization
IM 040-B (202)A	H6833 01C	144.4	144.4	2009	Kingman - Ashfork, (EB&WB), pavement preservation	Preservation
N0N 040-C-504	H6888 01C	147 .4	148.9	2006	County Line-Davenport Lake, mill and replace, 1.5 mi	Preservation
ARRA 040-C(203)A	H7845 01C	150	191.8	2010	Micro Seal EB & WB,42.8 mi	Preservation
IM 040-C(004)B	H52450	152.1	158.6	2003	Welch OP-Devil Dog, mill and replace 6.5 mi	Preservation
IM 040-3(088)B	H4345 01C	153.2	156.17	2003	Williams / Ash Fork EB, 2.97 mi, climbing lane	Expansion
NFA 040-D- NFA	HX184 01C	161.06		2007	Replace lighting pull boxes and load center cabinets, 127.2 mi	Modernization
BR 040-C(1)	H533701C	167.52	172.83	2000	Bridge seismic retrofit, bridge structure numbers 739,740,741	Modernization
N 900-0-515	H4295 04C	168, 184, 199		2001	VMS installation at MP 168,184,199	Modernization
BR 040-C(2)P	H533801C	175.88	178.24	2000	Seismic retrofit, structure numbers 742 and 743	Modernization
FA 040-C(200)	H7514 01C	177	182	2010	Shoulder improvement, MP 177-MP 182, 5.0 mi	Modernization
FA 040-C(201)	H7689 01C	182	190.84	2009	Navajo Army Depot WB mill and replace, 8.84 mi	Preservation
IM 040-c(005)A	H5780 01C	185	247	2005	Sign rehabilitation, 62 mi	Preservation
BR 040-C(3)A H5603 01C	H5603 01c	185.15	195.22	2003	Seismic retrofit, various bridges on I-40, 10.07 mi	Modernization
IM 040-D(019)A	H6366 01C	190	190	2009	Riordan - E. Flagstaff Tl, mill and replace	Preservation
I 40-3-509	H473701c	190.86	197.4	1999	Deck Joint Repair bridge rehabilitation, MP 190.86-197.4	Preservation
IM 040-C(2014)A	H7958 01C	190.92	200.92	2013	Riordan RR OP Country Club Tl, pavement preservation	Preservation
I 040-C-500	H5374 01C	191.57	191.77	2001	W. Flagstaff TI improvement	Modernization
STP B40-D(200)A	H6572 01C	193.16	193.16	2008	Pine Springs-Switzer Canyon SR 40B - mill AC, MP 193-197	Preservation
ACNH 40-3(87)A	H267602C	194.78	196.21	1999	I-17/ I-40 TI Phase II- Construct roadway, 1.43 mi	Expansion
ACNH 40-3(71)	H2676 01C	195	195	1999	I-40 and I-17 TI, Phase 1 Modification, traffic interchange modification	Expansion
I 040-D-507	H6204 01C	195	195	2003	Flagstaff/Holbrook, remove and replace concrete slab	Modernization

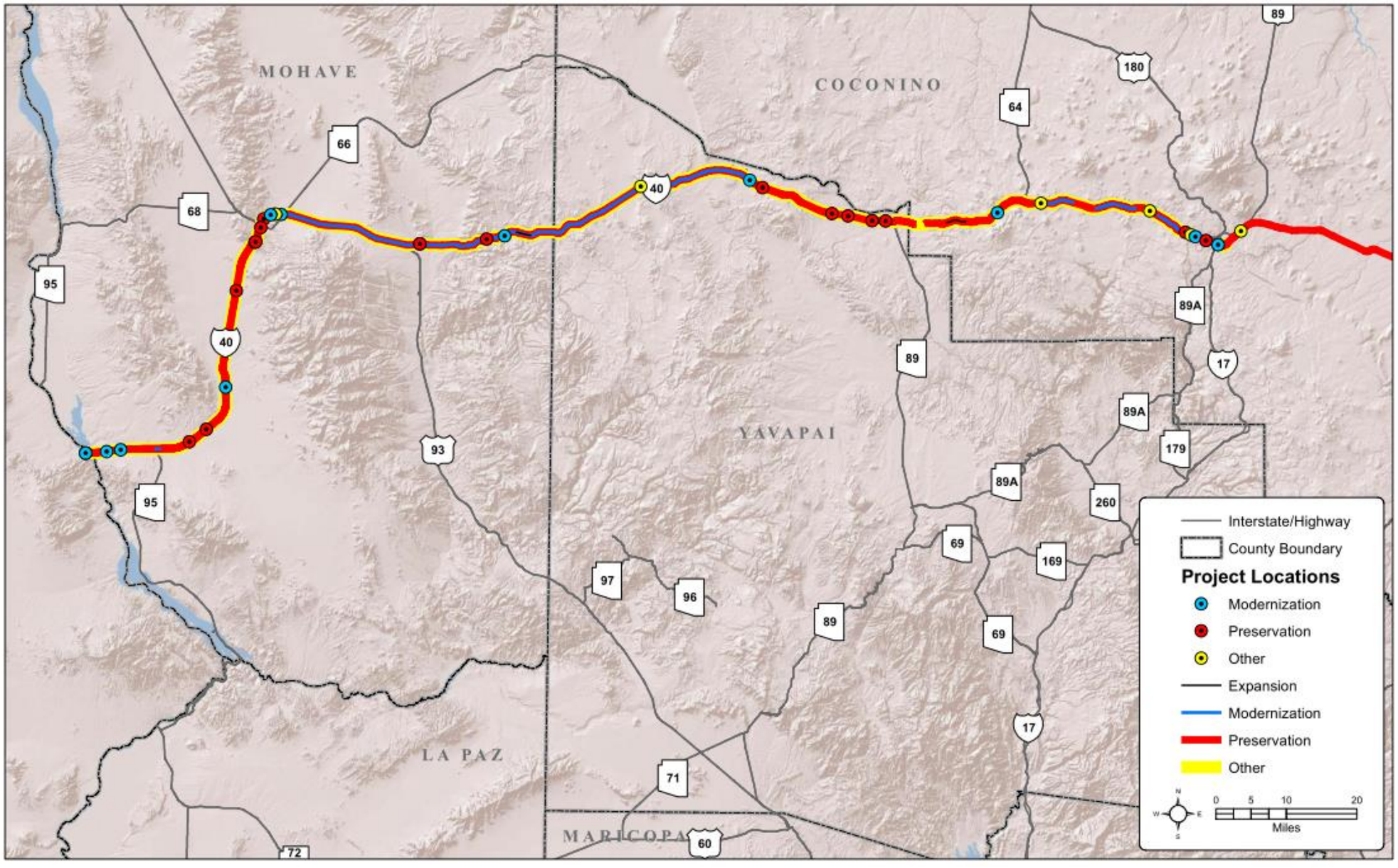

Figure 4: Modernization, Preservation and Expansion Projects on I-40 from 1999 to 2013

3 District Discussions

Discussions were held with ADOT Kingman District and Flagstaff District staff to receive District input on past investments, current needs, and future challenges for I-40. Summaries of the discussions are provided below, with information grouped by the general topics discussed.

3.1 Kingman District Discussion Summary

Meeting Date: August 13, 2014

Meeting Location: Kingman District Office

Attendance: ADOT: Mike Kondelis (District Engineer), Kara Lavertue (Development Engineer), Todd Steinberger (Maintenance Engineer), Chris Olson (Assistant District Engineer), Heidi Yaqub (MPD Project Manager); Kimley-Horn: Brent Crowther, Michael Grandy, Dave Perkins

General

- The Kingman District submits annual project needs and priorities to the ADOT programming group based on ADOT data and local agency input.
- Traffic on I-40 and other state highways in the Kingman District is primarily pass-through traffic rather than local resident traffic, so there is not significant public input to improve State highways in the Kingman District compared to other ADOT districts.

Pavement

- The majority of past investments and programmed projects are pavement preservation.
- Significant pavement preservation challenges are present for mileposts (MP) 4-8. Poor soil conditions, truck traffic, and pavement age justify pavement reconstruction. A sink hole has formed near one of the interchange ramps.
- The pavement Surface Treatment (PST) budget for FY 2014 was $850K. Annual pavement preservation needs identified by the District are $1.6M-$1.8M.
- District maintenance staff and Statewide pavement preservation staff annually drive all roads in the District and visually inspect the pavement condition to document pavement preservation needs
- Level of Service (LOS) pavement condition analysis is conducted by the ADOT Maintenance section in tenth-of-mile segments to establish LOS ratings by milepost.
- The Old Route 66 remnant pavements that have been incorporated into I-40 often have subsurface soil and pavement maintenance issues.

Bridge

- The ADOT Bridge Group conducts biennial inspections and has funding programmed for several of the bridges that need rehabilitation
- Several bridges are in need of rehabilitation. One of the more pressing needs is rehabilitating the Audley bridges at MP 112.8.

Mobility

- Environmental clearance is underway for I-40/US 93 interchange improvements recommended in DCR. The DCR has estimated that $88M is needed to construct the interchange, but funding has not been identified. In the interim, ADOT will conduct a study to identify lower cost improvements (<$1M) that can be implemented to improve operations and safety.
- In the long-term, new traffic interchanges (TIs) have been identified at Rancho Santa Fe (also known as Rattlesnake Wash), Kingman Crossing, and Cedar Hills. The Kingman Crossing TI will be a privately funded TI.
- MP 44-72 has been recommended to be widened to 3 lanes in each direction.
- The north-south orientation of the railroad effectively divides Kingman into east and west areas, with limited crossings of the railroad.
- Due to topography, future residential development will occur on the East Bench. The planned Rancho Santa Fe and Kingman Crossing TIs will provide better access to this part of Kingman from I-40.
- The Stockton Hill Planning Assistance for Rural Arizona (PARA) study has been approved by the Kingman City Council. Proposed improvements include a roundabout intersection. Property owner cooperation and funding will be required to implement most of the recommendations. The City may implement lower cost recommendations.
- There are several dynamic message signs (DMS) on I-40 that are used regularly to provide traveler information. The newest DMS sign was recently installed near MP 45. The 511 information system is another source of traveler information.

Safety

- Safety needs identified by District are submitted to ADOT HSIP group for studies and evaluation.
- Significant truck crash issues exist for MP 46-53 in Kingman area, particularly coming down the hill west of Stockton Hill TI at MP 49-51. Some involve cross-over-the-median crashes.
- The existing US 93/I-40 South (near MP 72) interchange needs to be reconstructed to meet current standards.
- Snow conditions in the winter often result in crashes and closures at MP 79-85. There are horizontal and vertical curves through this segment and there are no alternate routes when the freeway has to be closed.
- A significant truck crash problem exists for MP 0 to MP 44. This area is very flat and straight and has many run-off-road crashes are likely due to inattentive or sleepy drivers.

Freight

- The proposed Rancho Santa Fe TI would serve the Kingman airport and developing industrial areas near the airport.
- The airport has an industrial park with rail access and potential for freight traffic growth.
- An industrial corridor, including a truck freight distribution center, has been proposed in the vicinity of the Shinarump Road TI (MP 44) and Griffith Road TI (MP 37).
- Climbing lanes have been recommended for MP 45-47 and for MP 56-59.

- Currently, freight-related traffic congestion is heaviest at the West Kingman I-40/US 93 TI on Sunday in the west-to-north direction and on Tuesday/Wednesday in the south-to-east direction.
- Vertical clearance restrictions exist at the railroad overpass near MP 44 that requires rerouting of oversize truck loads.
- Increased truck traffic and overall traffic is expected when I-11 is completed for I-40 between US 93.

3.2 Flagstaff District Discussion Summary

Meeting Date: August 15, 2014

Meeting Location: Flagstaff District Office

Attendance: ADOT: Nate Reisner (Development Engineer), John Smith (sitting in for Tom Eckler, Maintenance Superintendent), Heidi Yaqub (MPD Project Manager); Kimley-Horn: Brent Crowther, Michael Grandy, Dave Perkins

General

- The Flagstaff District submits annual project needs and priorities to the ADOT programming group based on ADOT data, joint funding opportunities with public agencies, and public input. Projects that have crash histories receive higher District priority.
- The funding trend appears to be downward, with most available funding going to pavement and bridge preservation.
- The Flagstaff urban area is surrounded by U.S. National Forest lands, which limits development and results in higher density development.
- Funding is biggest challenge for the Flagstaff District, principally in the areas of pavement preservation and bridge deck maintenance.
- The District has very limited local resources to maintain concrete infrastructure and needs a concrete vendor contract.

Pavement

- Pavement issues have been identified between Williams and A-1 Mountain. Pavement issues typically relate to subgrade failures that need reconstruction due to freeze-thaw cycles and truck loadings.
- The Flagstaff District is using hot mix in place of cold mix for pavement preservation because the cold mix is not holding up. Hot mix has twice the life span of cold mix. The District strongly supports the use of hot mix.
- Intelligent compaction is a relatively new activity conducted by the District that can help identify subgrade issues up to 4 feet down. Several subgrade issues have been identified this way.
- District indicated that they have recently had several large-scale pavement maintenance projects ($3.75M total) funded. Current District maintenance funding levels ($1.7M) are not sufficient for maintenance needs, which exceed $1.7M.

Bridge

- Bridge rehabilitation is a high priority and relates to non-standard design and chemical deterioration of bridge decks for addressing snow/ice conditions.

Mobility

- The Initial Design Concept Report (DCR) for I-40 from Bellemont Road to Winona identifies the long-term needs and projects on I-40 in the District. The long-term vision for I-40 includes widening to 3 lanes in each direction through the Flagstaff urban area between the A-1 Mountain and Winona traffic interchanges (TIs) along with several new and reconstructed interchanges and geometric improvements along I-40. This vision will address needs for upgrading geometrics and bridges to standards, interchange improvements, and reconstruction of pavement due to subgrade problems.
- Future development is anticipated in the Woody Mountain area west of Flagstaff and in the Lone Tree area east of Flagstaff. Developers have not indicated an interest to privately fund the construction of a TI to improve access.

Safety

- Safety funds have recently been spent on rock fall mitigation west of Bellemont. Other safety related needs relate to improving geometric and bridge standards, particularly in curved segments and at TIs. The District was not aware of any existing crash issues that could be contributed to non-standard geometry or bridge conditions.
- Cameras are located on I-40 and I-17. Cameras provide input to snow plowing needs.

Freight

- It is estimated that 70 percent of I-40 traffic is truck traffic. Most east-west traffic on I-40 is pass-through traffic with limited truck destinations in the Flagstaff area. Truck flow patterns are not expected to change in the future. Most trucks to/from Phoenix via I-17 are through trucks to/from the central U.S.
- There are no known vertical clearance issues for permitted oversize vehicles, although the bridge at Ash Fork was recently hit by an oversize vehicle that did not have a permit.